of discursive material upon vital statistics; and a host of elementary hygienic facts with which every sanitarian is conversant,—are none of them points it can ever be necessary for the health officer to carry about with him for hasty reference.

The most useful sections, and those which most justify the *motif* of the book, are the following:—Those which deal with mathematical problems, and set forth useful algebraical and trigonometrical formulæ, together with a few logarithm tables; that upon demography and vital statistics; and the serviceable abstract of sanitary law, in which corresponding or similar sections of the Public Health Act, 1875, and the Public Health (London) Act, 1891, are considered side by side.

There is very little in the book which is not correct and up to date, save that which refers to the subject of water analysis. This contains many errors, and, since the utility of its introduction is very questionable, it is regrettable that it mars the all-round accuracy of the work. In this section Dr. Willoughby gives several results of his own analyses, and those who are familiar with the subject will find their experiences much at variance with the writer's.

In what he calls a typical sample of *rain-water* he found 0·63 grains per gallon of nitrates as HNO_3, and 0·114 and 0·172 parts per million of "ammonia" and "albuminoid ammonia" respectively; in *river-water* at Latchford he found no nitrates, not even a fraction of a part per million, and the "ammonia" and "albuminoid-ammonia" were 0·08 and 0·16 (parts per million) respectively. Loch Katrine water is, moreover, credited (and Wanklyn is quoted as the authority) with 0·008 parts per million of "albuminoid-ammonia," and with 0·004 of "ammonia;" and the former is said to correspond to 0·0056 grains per gallon!

While unquestionably the work contains some material which will make it useful to the health-officer, the health student will find much in it which he may peruse with advantage.

Engler's Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie. (Leipzig: W. Engelmann.)

SINCE Dr. A. Engler's appointment to the post of Director of the Berlin Botanical Garden and Museum, this periodical has become the organ of the very active staff of botanists of that establishment; and the comparatively recent German colonial policy has revived the interest in systematic and economic botany, to which it is devoted chiefly. Vols. xv. and xvi. are being published concurrently. This publication is partly devoted to original work and partly to a review of contemporary botanical literature. The fifteenth volume is largely taken up by contributions to the flora of tropical Africa, in the form of an elaboration by various botanists of the extensive collections made by numerous German travellers. Quite a host of new species are described, but, truth to say, nothing very remarkable in new generic types. *Hybophrynium* is a new genus of Scitamineæ, near *Trachyphrynium*, with which it was generically associated by Bentham and Hooker; and the Aroideæ, elaborated by Engler himself, include two or three new genera. *Pseudohydrosme* is characterised by a large, almost truncate spathe and a spadix without any terminal naked continuation.

Dr. J. Urban, who has been for some years engaged in collecting materials for a general flora of the West Indies, contributes "Additamenta ad Cognitionem Floræ Indiæ Occidentalis," a critical work, both from a botanical and a literary standpoint. No new genera are described.

One of the most interesting articles in the sixteenth volume is by Dr. O. Warburg, on the mountain plants of Kaiser Wilhelm's-Land, New Guinea. The collection of plants dealt with consisted of only fifty-three species, whereof thirty-two were supposed to be endemic, though the material of a few was insufficient for description. Two new genera are described, namely, *Hellwigia pulchra*, a pretty scitamineous plant, and *Zoelleria*, a singular boragineous plant, described as having ten nutlets in the place of the usual four! Among the new species are five rhododendrons, and the most noteworthy feature of the collection was the absence of essentially Australian types.

Another paper of general interest is Dr. Kränzlin's "Beiträge zu einer Monographie der Gattung Habenaria," excluding *Platanthera*, united with *Habenaria* by some botanists, 347 species are described; and they are spread over nearly the whole area inhabited by orchids.

Dr. Carl Bolle's "Botanische Rückblicke auf die Inseln Lanzarote und Fuertaventura" is a pleasantly written essay on the indigenous and cultivated plants of these islands. The "Jahrbücher" contain many other valuable articles. W. B. H.

Descriptive Geometry Models for the use of Students in Schools and Colleges. Designed by T. Jones, M.I.M.E. (Moss Side, Manchester.)

THE models are six in number. They are intended to show a line (1) by its projections, (2) by its traces; the inclination of an oblique plane (3) to the vertical plane, (4) to the horizontal plane; and to determine the angle (5) between two intersecting lines (6) between two planes. They are accompanied by hints for fixing and studying the models, and with a useful list of problems suggested as exercises for students. The clearness of the explanations, the simplicity of the constructive apparatus, and the compactness of the arrangements (all being contained in a handy cardboard box) commend Mr. Jones's work to students of solid geometry.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

Lion-Tiger Hybrids.

I HAVE read Dr. Ball's account of this subject in the issue of NATURE for February 23, 1893, and beg leave to call attention to the fact that the University of Cambridge possesses the skeleton and the stuffed skin of an *adult* hybrid between a lion and a tigress. I am able to supply the following information (which I have verified so far as it was possible) with regard to this specimen from a contemporary MS., entitled "Notice of the Lion-tiger which died in Cambridge, March 1833," by J. B. Melson, then an Undergraduate at Trinity College. This MS. no doubt contains the substance of a paper by Mr. Melson, which was communicated by Dr. Haviland to the Cambridge Philosophical Society, May 6, 1833. The paper was unfortunately not printed in the Transactions of the Society.

The Cambridge specimen, like those mentioned by Dr. Ball, was procured from the menagerie of Mr. Atkins. It was about six years old, and for some time previous to its death had been affected with paralysis of its hind quarters, arising probably from a distortion of the lower thoracic region of the vertebral column [which is still a marked feature of the actual skeleton]. Although inferior in size to either of its parents, the animal appeared to have attained its full dimensions. The shape of the head resembled that of the father (the lion), whilst the form of the body was more similar to that of the tigress. The body was faintly striped, while the prevailing shade was "of a dingy lion colour." The animal had neither a mane nor a tuft at the end of its tail.

The specimen was a female, and Mr. Melson states that "all the individuals of this hybrid race have as yet been females." The orifice of the vagina was smaller than in the tigress; and

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the uterus was "merely rudimentary and nothing more than a membranous tube terminating in the two fallopian tubes." The ovaries were normal in appearance, though very much smaller than those of the full-grown lioness or tigress.

The extreme length of the skull, from the end of the occipital crest to the end of the præmaxillæ, of the specimen now in the Cambridge Museum, is 290 mm.; the distance between the foramen magnum and the end of the præmaxillæ is 235 mm.; and the extreme zygomatic breadth is 190 mm. The ascending process of the maxilla ends at a point 3 mm. in front of the posterior end of the nasal bones, and has a somewhat rounded termination. In these characters the skull of the hybrid resembles that of the lion much more closely than that of the tiger.
S. F. HARMER.

University Museum of Zoology, Cambridge,
February 27.

Travelling of Roots.

THE mode in which roots travel in pursuit of food (moisture) is often remarkable. Innumerable instances have been published. But I think the inclosed is one of the most striking which I have come across. The specimen kindly sent to the Kew Museum by the vicar of Petersham is most extraordinary. The roots seem to have behaved more like the mycelium of a fungus than an ordinary axial structure.
W. T. THISELTON-DYER.

Royal Gardens, Kew, Feb. 24.

Memorandum by the Rev. W. H. Oxley, Vicar of Petersham, dated February 16, 1893.

Roots of a Wistaria from the dining-room of Eden House, Ham, just demolished.

The root entered the room by a very small chink in the side of the window, near the ceiling, and on removing the paper, which had not been disturbed for many years, from the walls (of the room about 14ft. square) the whole of the plaster beneath the paper was found covered with a fine network of roots spreading all round the room. The specimen is about one-third of the whole roots and the stem where it entered the room. There was not the faintest appearance of anything of the sort on the surface of the wall paper to give rise to the suspicion of these roots being there, and the room was continually inhabited, with fires, &c.

The Flight of Birds.

WITH reference to an extract from *Science* on the flight of birds, which appeared in your "Notes" of February 16, I agree with the writer of that extract that the rapidity with which the generality of birds travel is often considerably over-estimated.

Some few months ago, whilst crossing, by G.W.R. express, the moors of Bridgewater Level in Somerset, a couple of turtle-doves rose at a distance of about eighty yards from the train, and flew for a considerable distance in a line nearly parallel with the rails.

I observed them with much interest, for I wished to have some comparison of their power of flight with that of some "homing" pigeons in my possession, and perceived that they were being slowly overtaken. They must have flown fairly parallel with the line of rails for at least 500 yards, and finally bore away northward. We must have been travelling at about forty miles an hour at the time, so that their speed would have been a little less than that. I was the more surprised at this as I had had "homing" pigeons, trained by myself, which, on a clear, calm day, had flown from the Quantock Hills to Taunton (a distance of seven miles) in less than eight minutes—a quite superior rate of flight, which, however, I do not think they would continue for a long distance. The Columbacei generally may be considered good flyers; the turtle, however, I believe from observation to be somewhat below the average standard of excellence. It certainly cannot be compared with the Passenger Pigeon of America, which has frequently been killed in the neighbourhood of New York with Carolina rice still undigested in its crop—having probably accomplished a journey of between 300 and 400 miles in about six hours, giving the high record of sixty miles an hour for six hours in succession. My own impression is that there is a great difference in the speeds of various orders and tribes of birds. I have repeatedly observed the fieldfare, which is a fairly strong flyer, overtaken by trains of which I have been an occupant, and which could not have been travelling more than forty miles an hour. On the other hand, I have witnessed the pursuit of a wood pigeon or cushat by a hawk, in which both birds exhibited powers of flight which might seem incredible to persons unobservant of nature. In this instance I should have estimated the speed of the pigeon, which was straining every muscle to reach the shelter of a belt of timber, to be about sixty miles an hour; whilst that of the hawk, which flew with little effort, could not I think have been less than eighty, during the brief period that they were within my sight. I should be glad to hear from any of your correspondents their opinion as to the rapidity of flight in the Raptores (British).
HERBERT WITHINGTON.

Taunton, February 22.

The Niagara Spray Clouds.

I DO not remember having seen anywhere a reference to the fact that the spray clouds of Niagara exhibit an ice bow in clear frosty weather.

I had an opportunity last week of seeing a very fine complete bow, the inner one, the outer being absent.

There was no trace of the mock suns or of the bands of white light usually present; though I have seen ice bows without the latter, I have never seen one before without any trace of mock suns; these are generally accounted for by supposing the presence of hexagonal ice prisms. I would suggest the inference that the ice crystals in the Niagara spray clouds are not prisms but rhombs.
CHAS. A. CARUS-WILSON.

McGill University, Montreal, February 6.

British New Guinea.

IN NATURE (vol. xlvii. p. 345) Mr. H. O. Forbes has a lenient review of Mr. J. P. Thomson's "British New Guinea," in which he reproduces a figure of four natives. In the original they are called "native mountaineers" (p. 95). As a matter of fact only the two central men are mountaineers; the two outermost being coast natives who acted as decoys to induce the timid highlanders to submit to being photographed. Mr. Thomson has a reprehensible habit of inserting figures which, while they illustrate the contiguous text, really belong to a different part of British New Guinea than that there dealt with. I fancy Mr. Forbes has been deceived in this respect, for the last figure which appears in the review is entitled by Mr. Thomson "Native Ornaments" (p. 120), and, though occurring in his description of the Fly River district, represent, if I am not mistaken, Papuan Gulf natives, most probably Motu-Motuans.
ALFRED C. HADDON.

I QUITE agree with Prof. Haddon's remarks above, which you have been good enough to submit to me, with regard to the mountaineers of the interior of New Guinea. They enter into details which, in an already over-long review, I had no space for. There is no doubt about the right-hand figure (p. 346) being *not* a mountaineer. I was less confident about the man on the left hand. The *two central figures* recall to me perfectly the people of Uburukara, of whom I took photographs in 1886, the plates of which were ruined during my disastrous march down the Goldie, and it was they who specially attracted my attention. With regard to the "Fly River" natives, I have never had the fortune to see any of them, but I certainly took the central figure to be one, while remarking to myself the likeness of the right-hand man to a Motuan—to men with whom he could be matched in any village indeed between the Gulf and Kerepunu.

104, Philbeach Gardens, S.W. HENRY O. FORBES.

Some Lake Basins in France.

I REGRET that, through some inadvertence on my part, the name of the author of the "Atlas des Lacs Français," mentioned in my letter (p. 341) is wrongly printed. It should be Delebecque. In a letter received from M. Delebecque, he informs me that "the direction of the arrow on the map of Lake Léman is not exactly N., but N. 7° W." He informs me also that the curious funnel-shaped hole at the northern end of the Lake of Annecy, which I suggest may be a submerged swallow-hole, is the site of a spring. This fact, however, need not be fatal to my suggestion, because the changes in level might convert what was once a swallow hole into a spring. At present water at one time flows up from the dolinas of the Julian Alps, at another it drains off down them.
T. G. BONNEY.

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